

3.4 #19  $s(t) = t^2 - 3t + 2$   $t \geq 0$   $s = \text{meters}$   
 position function  $t = \text{seconds}$


a. Displacement  $s(5) - s(0) = 5^2 - 3(5) + 2 - (0^2 - 3(0) + 2)$   
 $= 25 - 15 + 2 - 2$   
 $= 10 \text{ m}$

b. Average Velocity  
 $AV = \frac{s(5) - s(0)}{5 - 0} = \frac{10}{5} = 2 \text{ m/s}$

c. Instantaneous Velocity  $s'(t) = v(t) = 2t - 3$   
 $s'(4) = v(4) = 2(4) - 3 = 5 \text{ m/s}$

d. Acceleration  $s''(t) = v'(t) = a(t) = 2 \text{ m/s}^2$   
 acceleration is a constant

e. Change Direction  $v(t) = 0$   $0 = 2t - 3$   $t = \frac{3}{2} \text{ sec}$   
 The particle changes direction at time  $t = 1.5 \text{ sec}$ .

f. Minimum point   
 $s(1.5) = (1.5)^2 - 3(1.5) + 2 = 2.25 - 4.5 + 2 = -0.25$   
 The particle is at its min. location of  $s = -0.25$   
 at  $t = 1.5 \text{ sec}$ . since Velocity changes from  
 Neg. to pos. at  $t = 1.5 \text{ sec}$ .